



TELEPOR



**Human Systems Integration (HSI)
Assessment: Manpower, Personnel,
Training, &
Human Factors Engineering**

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Satellite Comm. Stations





Agenda

- **Description of HSI methodology**
- **Manpower requirements assessment**
- **Personnel knowledge(s), skills and aptitudes (KSAs) assessment**
- **Training requirements assessment**
- **Human factors engineering assessment**







Assessment Approach to Manpower Requirements



- **Visits to 7 future Teleport sites (structured interviews)**
- **Assessed current operations & maintenance manpower requirements**
- **Anticipated/predicted Teleport maintenance manpower requirements**
- **Also visited RNOSCs, CONEXs & RSSCs to assess Teleport impact on Manpower, Personnel Skills & Training**
- **Examined potential Teleport operations manpower requirements**
 - **ORD Requirements (peacetime & surge to MTW)**
 - **Two conditions:**
 - **Current distribution of missions continues (status quo)**
 - **Future GMF missions allocated based on capacity; Navy C4I missions distributed based on expected user requirements**





Highlights of Manpower Requirements Assessment



Assumptions:

- **Current manning levels at the seven sites are not excessive**
- **Planning process for C & Ku band missions will be virtually identical to planning X band missions**
- **Teleport missions will require less trouble-shooting and coordination than current STEP missions**
- **The number of peacetime missions will grow by 50%**





Assumptions (con't)

- **Concerning support for an MTW**
 - All peacetime missions will be dropped or shift to other sites
 - MTW will consume the supporting site's mission capacity
 - Site will experience a major surge, then relative stability
- **Teleport UHF missions will have manhour requirements similar to those associated with Navy C4I missions**
- **Additional personnel acquired to support Teleport predominately will be contractor personnel or government civilians**





Maintenance vs. Operations



- **Maintenance assessment is fairly straight forward**
- **No such thing as a “standard mission”**
- **Teleport manpower requirements impact on operations will be greater than impact on maintenance**



Teleport Operations Manpower Assessments



	<u>Requirement</u>	<u>Condition</u>
A	Meets peacetime opns for one year	Current distribution remains valid; 50% growth each site
B	Surge: 6 mos peacetime opns + 6 mos support to MTW	Current distribution remains valid; 50% growth each site GMF msns allocated
C	Meets peacetime opns for one year	(capacity); Navy C4I msns distributed (expected procedures) GMF msns allocated
D	Surge: 6 mos peacetime opns + 6 mos support to MTW	(capacity); Navy C4I msns distributed (expected procedures)





Manpower Recommendations

	North-west	Camp Robert s	Fort Buckne r	Wahi-awa	Lago Patria	Ram - stei n	Land- stuhl
A	8.3	6.2	7.4	10.0	4.7	3.3	3.3
B	11.9	11.8	12.2	12.3	10.5	4.3	6.5
C	5.4	11.6	9.1	0.7	11.5	1.1	4.2
D	10.5	14.5	13.1	7.7	13.9	3.2	7.0
TPO FTE Projectio n	9	9	9	9	9	5	5
WGI's HSI WGI Recomen d	11	13	13	10	12	4	7

Total: Teleport requires ~70 more people 10



Assessment Approach for Personnel KSAs



- **Examined KSAs currently required of uniformed, civil servant & contractor operators/maintainers**
- **Analyzed KSAs required at commercial Teleport, at Northwest (C), and at Ramstein (C & Ku)**
- **Queried numerous, experienced SATCOM professionals**
- **Compared military SATCOM career specialties to commercial certifications and commercial job descriptions**





Highlights of Personnel Skills Assessment



- **Military KSAs very comparable to commercial Teleport KSAs**
- **Virtually unanimous opinion of SATCOM professionals interviewed: “While Teleport equipment will operate over a different portion of the frequency spectrum, *the basic principles and fundamentals* or the equipment and operations will be the same**
- **Confirmed by Site Manager of Commercial Teleport (former military SATCOM operator)**
- **Expect some new techniques & procedures, but no new skills anticipated**





Highlights of Personnel Skills Assessment (con't)



- **Some inquisitiveness expressed:**
 - Acquiring & tracking commercial satellites
 - Planning & coordinating C & Ku missions
 - New equipment (e.g., MIDAS)
- **New skills with new generations of Teleport?**
 - Extremely High Frequency (EHF)
 - Internet Protocol (IP)





Assessment Approach for Training Requirements



- **Reviewed current SATCOM training programs**
 - Formal & informal
 - On site & Schoolhouse
- **Site Readiness Certification**
- **Assessed New Equipment Training (NET) & envisioned sustainment training**
- **Explored alternative training options**





Highlights of Training Assessment



- **Site certification is a major factor for uniform staffed sites, a minor issue for contractor run sites**
- **Army Signal School responding to requests from the field - operating under time & funding restraints**
- **Site certification will continue under Teleport; but expect additional Teleport personnel will be civil servants or contractors; certification of new personnel should not increase**
- **Sustainment training will be very important for Teleport sites**
 - **Computer Based Training (CBT)**
 - **Visiting, formal training courses (e.g., ISEC)**
 - **Distance Learning**





Highlights of Training Assessment (con't)



- There seems to be a need for some *centralized Teleport systems level training*
- Placing commercial equipment at Ft. Gordon is not practical for small density MOS training
- Idea for specialized Teleport training at Ft. Monmouth SEL (TDY/TAD en route) popularly received at sites
- DISA should develop Teleport training / certification standards that local commanders can modify/build-on to suit their specific sites





Human Factors Engineering (HFE) Evaluation of 7 Teleport Sites



- **In 2002, visited each of 7 stations; examined:**
 - **Technical documentation**
 - **Engineering drawings**
 - **Existent layout of floor plans**
 - **Teleport insertion plan layout**
 - **Workplace modification plans & specifications**
- **Critiqued envisioned adjustments to operator & maintainer procedures**
- **Critiqued control console & work station design re: MIL-STD-1472, MIL-HNDBK-759, general HFE Stnds**
- **Identified potential human factors issues; making recommendations**







Design Standardization of Teleport Stations is Desired



- **Desire for common use Teleport language and terminology across Teleport & all telecommunication stations (should be driven by DISA)**
- **Functional & information flow within stations**
- **Operating & maintenance procedures, worker certification & quality assurance should be standardized**
- **Design and layout of operator control center work stations (hubs) should be standardized among sites**





Human Engineering Observations



- **Sites were then, and now still are undergoing significant renovations & floor plan changes**
- **Intermingling & integration of new & legacy equipment alters flow of information & of work**
- **Layout of operator control center hubs affected**
- **Operating & maintenance procedures slightly altered**
- **Many COTS rack-mounted equipments differ by type/ manufacturer; not easily altered for HFE suggestions**
- **Equipment labeling inconsistent; each site improvised own labeling scheme; some innovations observed should be adopted Teleport-wide**











Operator Control Center Hub Design



- **Control console layouts at each site differ; some are laid out better than others; some now could use a HFE scrub/reconfiguration**
- **Shortage, inefficient use of operator console space**
- **Proliferation, duplication (excess?) of computer towers, CRTs, printers, mounted in prime real estate**
- **Alternative operator console design suggested at Okinawa Space Command is not really better**





Space Command's Operations Floor Okinawa, Japan





HFE Recommendations for Operator Control Center Hubs



- **Now with perspective of HFE criteria, should re-examine functional groupings of computers, controls, displays, printers, etc. at various sites**
- **Should consolidate, reposition some equipments**
- **MIDAS offers unique opportunities to combine equipments, reposition many operator functions**
- **Could acquire flat panel displays vice CRTs to conserve VDT space; reposition computer towers**
- **Should make adjustments to lighting for prevention of reflections, glare at operator consoles, on VDTs, etc.**













HFE of General Station Design



- **Found a variety of labeling schemes for individual equipments & the racks for them**
- **Most labels are small font; not of good contrast; difficult to read, esp. in poor lighting**
- **Logic flow of equipment labeling is not consistent within several stations**
- **Use of color coding varies, and also is not consistent within & across stations**







Operator & Maintainer Manuals



- Each station has its own “system” of maintaining, filing, storing, updating & making manuals available for operations and maintenance personnel
- Completeness of sets of manuals varies among sites; mostly true of manuals for legacy COTS equipments
- Some manuals are not being regularly updated
- Quality of written manuals themselves varies
- Stations should attend to matters of updating, accessibility, & reliable storage of all manuals
- Mgmt should help sites ensure user-friendly equipment, resource systems for manuals on all new Teleport terminals & stations
- Electronic media, CD-ROMs, etc. should be considered, and adopted where we can







Other HFE Considerations



- **Maintenance trouble shooting equipment and procedures appeared okay**
- **Acoustical noise & air ventilation systems ok**
- **Compliance w/Americans with Disabilities Act**
- **High voltage, 2- person operation and safety**
- **Should retain employee break rooms at sites**







Ongoing HSI Actions for Teleport



- **Complete all reviews of Teleport Generation One HSI Reports (Finalize them)**
- **Assessing personnel skills & training impact of fielding EHF & Generation II Teleport equipment**
- **Continuing involvement in assessment of Teleport training (NET & sustainment training) requirements**
- **Assisting in development of Teleport Master Training Plan**
- **HSI assessment of impact of IP on Teleport operations**





Questions ?





Questions?

